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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09-910,661

Applicant(s)

Agarwal

Examiner

George Goudreau

Group Art Unit

1763

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on 7-20-01 (i.e. - Paper # 1-3)

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 68-72 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 68-72 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 3

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Interview Summary, PTO-413

☐ Notice of Informal Patent Application, PTO-152

☐ Other _____

Office Action Summary

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15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

16. Claims 68, and 70-71 are rejected under 35 U.S.C. 102(e) as being anticipated by

Li et. al. (6,228,769).

Li et. al. disclose a process for detecting the endpoint of a cmp polishing process used to cmp polish a SiO₂ layer on a wafer to an underlying Si₃N₄ polishing stop layer using a KOH based cmp slurry. Once the SiO₂ layer is removed from the surface of the Si₃N₄ polishing stop layer, NH₃ is formed in the cmp slurry when the KOH reacts with the Si₃N₄ layer. The cmp slurry is transported from the polishing platen to a filter where NH₃ in the cmp slurry can be extracted from the slurry using a type of vaporization process. The vaporized NH₃ which is contained in a carrier gas is then fed to a mass spectrometer where it is analyzed. The cmp polishing process is automatically terminated upon the detection of a targeted level of NH₃ in the cmp slurry which is indicative of the fact that the polishing stop layer has been reached. The cmp polishing platen is rotated relative to the wafer carrier during the cmp polishing process. This is discussed specifically in columns 3-6; and discussed in general in columns 1-8. This is shown in figures 1-5.

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17. Claims 68, and 70-71 are rejected under 35 U.S.C. 102(e) as being anticipated by Cargo et. al. (6,110,831).

Cargo et. al. disclose a process for detecting the endpoint of a cmp polishing process which is used to cmp polish a layer on a wafer (19) down to an underlying marker layer which contains indicator atoms such as P or B. The cmp slurry is collected from the polishing platen (11), and fed via a tube (81) to a mass spectrometer (85) where it is analyzed for its content of P or B. The cmp polishing process is then automatically terminated upon the detection of a targeted level of dopant ions being present in the cmp slurry on the polishing platen (11). The cmp polishing platen (11) is rotated relative to the wafer carrier (17) to facilitate the cmp planarization of the wafer surface. This is discussed specifically in columns 2-5; and discussed in general in columns 1-6. This is shown in figures 1-10.

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. Claims 69, and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied in any of paragraphs 16 or 17 above.

The references as applied in any of paragraphs 16 or 17 above fail to disclose the following aspects of applicant's claimed invention:

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- the specific usage of a polishing pad which contains abrasive particles which are released into the cmp slurry during the cmp polishing process;
- the specific usage of a filter to remove abrasive particles from the cmp slurry prior to feeding the vaporized cmp slurry to the mass spectrometer; and
- the specific vaporization of the cmp slurry prior to analyzing the cmp slurry

It would have been obvious to one skilled in the art to employ a filter to remove abrasive particles from the cmp slurry to be analyzed in the mass spectrometer in any of the process taught above prior to feeding the cmp slurry to the mass spectrometer based upon the following. The filtering of a cmp slurry to remove abrasive particles from the cmp slurry prior to analyzation of the cmp slurry using some type of chemical instrumental analysis is conventional or at least well known in the chemical instrumentation arts. (The examiner takes official notice in this regard.) Further, it would have been desirable to remove abrasive particles from a cmp slurry which can interfere with the analysis of the cmp slurry prior to actually analyzing the cmp slurry with a mass spectrometer.

It would have been desirable to provide some means for vaporizing the cmp slurry in any of the processes taught above prior to analyzing the cmp slurry with a mass spectrometer based upon the following. The usage of a vaporizer to convert a fluid to be analyzed in a mass spectrometer from the liquid phase to the vapor phase is conventional or at least well known in the chemical instrumental analysis arts. (The examiner takes official notice in this regard.) Further, some means would have necessarily have needed to have been provided for vaporizing

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the cmp slurry in the process taught above prior to analyzing it with a mass spectrometer since the mass spectrometer will only analyze gasses, and not liquids.

It would have been obvious to one skilled in the art to obvious to one skilled in the art to employ a cmp polishing pad which contains abrasive particles which are released into the cmp slurry during the cmp polishing process in any of the processes taught above based upon the following. The usage of a cmp polishing pad to planarize a substrate wherein the cmp polishing pad contain abrasive particles which can be released during a cmp polishing process is conventional or at least well known in the cmp polishing arts. (The examiner takes official notice in this regard.) Further, some means would have necessarily have needed to have been provided for cmp polishing the substrate. This simply represents the usage of an alternative, and at least equivalent means to those means which are specifically taught.

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -308-3599.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.


George A. Goudreau/gag

Examiner AU 1763